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Agile Mind Response to "Algebra I Review of Standards for Mathematical Practice"

We begin with thanks to the reviewers for their time and attention. The careful evaluation of curriculum and assessment materials is an important, painstaking, and often overlooked part of instructional leadership, and we understand the time and thought that the process requires. We learned from each of the reviewers, and we greatly appreciate the opportunity to provide additional information in response to the reviews.

In this response, we will address the reviews of the Agile Mind Algebra I materials related to the Standards for Mathematical Practice.

Several reviews appeared to indicate that there is limited to moderate evidence that the Dana Center/Agile Mind materials support the Standards for Mathematical Practice contained in the Common Core State Standards for Mathematics (CCSSM). In designing the Dana Center/Agile Mind mathematics course programs, the Dana Center and other leading educators enacted a guiding philosophy that anticipated the development of the CCSSM: that, to truly engage in mathematics, to achieve at high levels, and to persist through learning challenges that prepare them for higher education and the contemporary workplace, students need to develop successful methods of approaching mathematical learning. For that reason, mathematical reasoning, effective communication, making connections, and problem solving are cornerstones of the Dana Center design represented in our courses.

It is a key reason why the Dana Center and Agile Mind have been chosen by leading foundations to work with districts and states over the next three years to facilitate their migration to the CCSSM. Also, we recognize that a part of the adoption of the CCSSM is the reconciliation, by educators, of alternate views of how best to support these new practices.

Thus, ours is not a traditional textbook curriculum, nor does it represent a simply "digital" curriculum. Rather, the Dana Center/Agile Mind course programs constitute a next-generation teaching and learning system designed to support a dynamic and highly productive classroom environment with teacher as conductor. This system includes, under one umbrella, comprehensive resources that make teaching and learning more effective and work together to provide a complete teaching and learning experience, encompassing:

- next-generation technologies that support teacher-facilitated classroom instruction
- professional advice and support for teachers, including research-based, high-yield teaching and learning strategies
- student practice, review, and test preparation
- embedded formative assessments
- real-time grading and reporting to guide instruction

The processes and proficiencies described in the CCSS for Mathematical Practice are thus supported through a blend of these three critical components:

1. Online instruction and assessment resources

2. Online, printable advice to teachers on enacting lessons – supported by the online instructional pages and printable Student Activity Sheets – that engage students in problem-solving, collaborative work, and communication through written and oral discussion and presentation

3. Printable constructed response assessments that equip teachers to provide students with additional opportunities to develop proficiency with the Standards for Mathematical Practice, including students making sense of problems and persevering in solving them, constructing and justifying arguments, using tools, and attending to precision

When these three resources are used together, students are supported in their learning and held responsible for the practices and proficiencies that are highlighted in the Standards for Mathematical Practice, and that are critical to a student's long-term success in their mathematical education. A review of all three components of our programs makes clear the full vision of the student learning experience.

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Agile Mind Response to "Agile Mind Algebra I Indiana Review"

We begin with thanks to the reviewers for their time and attention. The careful evaluation of curriculum and assessment materials is an important, painstaking, and often overlooked part of instructional leadership, and we understand the time and thought that the process requires. We learned from each of the reviewers, and we greatly appreciate the opportunity to provide additional information in response to the reviews.

In this response, we will address the reviews of the Agile Mind Algebra I materials related to the Standards for Mathematical Content. We focus our comments in this response on areas of the Common Core State Standards for Mathematics that the reviewers identified as lacking coverage in the Agile Mind Algebra I materials.

Extend the properties of exponents to rational exponents.

N-RN.1	Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. *For example, we define* $5^{1/3}$ *to be the cube root of 5 because we want* $(5^{1/3})^3 = 5^{(1/3)3}$ *to hold, so* $(5^{1/3})^3$ *must equal 5.*
N-RN.2	Rewrite expressions involving radicals and rational exponents using the properties of o2wexponents.

The reviews seem to indicate that no discussion of rational exponents or radicals was found in the Agile Mind Algebra I materials. However, the meaning of rational exponents with numerator 1 is developed in the topic **Laws of exponents**. In the same topic, students use the laws for multiplication to make meaning of cases in which the exponent is rational with numerator greater than 1. Additionally, students make connections between the geometric and algebraic representations of square roots as they learn how to simplify expressions involving radicals that arise in solving quadratic equations in the topic **The quadratic formula**.

Write expressions in equivalent forms to solve problems

A-SSE.3	Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.⋆
	b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.

The reviews indicate that this standard is "Not covered" in the Agile Mind Algebra I materials. However, in the topic **Modeling with quadratic functions** students connect concrete models to algebraic manipulation as they learn how to complete the square to transform quadratic functions to the form $\boldsymbol{y = a(x - h)^2 + k}$. In the same topic, students interpret the vertex of the graph of a function expressed in this form in the context of the situation it models.

Perform arithmetic operations on polynomials	
A-APR.1	Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.

The reviews indicate that this standard is "Not covered" in the Agile Mind Algebra I materials. However, in the topic **Operations on polynomials** students add, subtract, and multiply polynomial expressions.

Create equations that describe numbers or relationships	
A-CED.1	Create equations and inequalities in one variable and use them to solve problems. *Include equations arising from linear and quadratic functions, and simple rational and exponential functions.*⋆
A-CED.3	Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context. *For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.*⋆

The reviews seem to indicate that these standards are "Not covered" in the Agile Mind Algebra I materials. However, students begin their study of the relationship between functions and equations early in the course in the topic **Variables and functions**. Students create and use equations and inequalities to represent constraints and solve problems in several topics, including **Solving linear equations**, **Solving linear inequalities**, **Absolute value equations and inequalities**, **Modeling with exponential functions**, **Solving quadratic equations**, and **The quadratic formula**. Although the type of equation or inequality addressed across these topics may vary, the approach we take is the same; equations are presented as naturally occurring from functions created to model situations. With this approach, students see that the tools of function representation (graphs, tables, and symbolic representations) can be used to understand and solve equations.

In the topics **Formulating and solving systems** and **Other methods for solving systems**, students create systems of equations to represent constraints in modeling contexts. Again, because of their understanding of the connection between equations and functions, students are able to use multiple representations in their work with systems.